as the sun is set; in fact the following of the sun is not so pronounced after 3 o'clock (and earlier on dark days) as up to that hour. It seems as if the sun drew the leaf around by its own attraction, and the blade moves back to its point of rest when the force is withdrawn. There was no evident daily motion observed in the remaining portion of the long petioles. It is true that they varied their position from time to time, but with no regularity. Petioles on the eastern side of a plant remain more nearly horizontal than those located elsewhere. Those upon the north and south sides are more upright, with a tendency to point eastward. The western leaves are nearly upright, so that the blades may be able to catch the direct rays of the morning sun. At night there is an evident falling of the petioles as if to assume a position of rest, while the blades become nearly horizontal at the same time. By 9, or at most 10 o'clock in the evening the plant reached its position of repose, and an hour or more before the sun's morning rays can strike the plant the blades are all in position. Three distinct views of a malva patch may be obtained at any time when the sun is shining. If the view is, so to speak, from the sun, that is, in the direction of the rays of light, only the upper surfaces of the leaves are seen; if toward the direction of the sun, the under surfaces are in view. The difference between the shades of green of these two views is very marked. A third view is at right angles to the sun's rays, from which point the leaves are only seen by their edges, which are inclined from the perpendicular, the angle depending upon the height of the sun at the time of observation. Upon a dark, stormy day the heliotropism of the leaves is in a large degree suspended.—BYRON D. HALSTED, *Botanical Laboratory, Ames, Iowa.*

Leaf Prints.—Several years ago I devised a method of taking leaf prints of marked beauty, and a specimen of the work recently sent to Dr. Gray elicited the reply: "'Tis a new way; better send account of it to BOTANICAL GAZETTE," etc. I do so, prompted by the belief that the method may be of actual usefulness to the botanist as well as a refining recreation for those who love nature "on general principles." There will be needed for the work: 1. A small ink roller, such as printers use for inking type. 2. A quantity of green printer's ink. 3. A pane of stout window glass (the larger the better) fastened securely to an evenly planed board twice the size of the glass. A small quantity of the ink is put on the glass and spread with a knife, after which it is distributed evenly by going over in all directions with the ink roller. When this has been carefully done, the leaf to be copied is laid on a piece of waste paper and inked by applying the roller once or twice with moderate pressure. This leaves a film of ink on the veins and network of the leaf, and by placing it on a piece of blank paper and applying considerable pressure for a few moments the work is done, and when the leaf is lifted

from the paper the impress remains with all its delicate tracery, faithful in color and outline to the original.

To get the best results, however, several points must be carefully noted. Get a quarter or half pound of *dark* green ink, which is put up in collapsible tubes costing from 50 cents to $2 a pound, according to quality. As sold it is invariably too thick for this purpose, and should be thinned by adding several drops of Balsam Copaiba to as much ink as may be taken on a salt spoon. Much depends on the proper consistency of the ink. In inking, the leaf is apt to curl on the roller, but it should part readily from it. In case it sticks tightly, *the ink is too thick.* Take care that the ink is evenly distributed on the glass and roller, as it is essential that each part of the leaf receives an equal coating of ink. If the leaf is large, ink it part by part, keeping the roller supplied frequently. A roller three inches long, costing 40 cents, will answer for all small leaves and branches of plants (clean the roller with benzine after using). If the leaf is finely veined the lower surface makes the better print, but if the veins are coarse and large the upper surface may be used. If the specimen is fleshy or brittle, allow it to wilt until it becomes more pliable, or, if necessary, it may be pressed and dried first. In most cases the best copy is obtained after taking one or two impressions, as the leaf takes the ink better after several applications. A good quality of unsized paper that is made slightly damp by putting in a cellar several hours before using is best for general work, but in other cases well sized paper will take a copy that will allow a *foliotype* (may I coin the word?), to bear inspection side by side with a good lithograph. I find a little press very valuable in making the impression, especially if the leaf is at all coriaceous. If it be soft, it should be covered with a few thicknesses of newspaper. If it is irregular in thickness, paper may be laid over the thin parts so that equal pressure is received. This is necessary with all leaves that have thick stems. If the leaf or branch is very irregular or delicate, or in the absence of a press of any kind, the specimen may be covered with several layers of paper and held in place with one hand while the pressure is applied with the thumb or palm of the other hand as required.

These particulars are as complete as practicable; experiment will lead to many improvements in details. Employ tact and neatness and you will be surprised at the result. For illustrating monographs, and similar papers where the number is too limited to warrant an expensive lithograph, for identifying a rare specimen, or as an adjunct to an herbarium, combining portability, unalterability and beauty withal, the method seems particularly fitted. But aside from this, others may find a delightful and instructive recreation in taking prints of the entire flora of the old farm, the trees of a certain grove, the native annuals of a county, the ferns of a state, or any other special field that seems most

inviting. Such copies may be taken in a blank book suited to the purpose, or better, take them on single sheets of uniform size, as in this way imperfect copies may be thrown out, and when the work is completed they may be named, classified and bound, making a volume of real value and worthy of just pride. I would esteem it a favor as well as a pleasure to hear personally from any who may employ this method in any way the coming season, concerning the progress of their work, with its attendant imperfections and successes.—HORACE M. ENGLE, *Marietta, Pa.*

A method of staining Peziza specimens.—Decolorize the Peziæ by soaking in a solution of corrosive sublimate (1 to 2000 Aq. Dist.). Wash from precipitated calomel by agitation in distilled water. Macerate in 90 per cent. alcohol for twenty-four hours. For immediate examination, lower for a few seconds in a strong hæmatoxylin solution, wash in distilled water; or, if preferred, use the dilute hæmatoxylin fluid. (See Campbell, *ante*, p. 40.)—CHARLES E. FAIRMAN.

A visit to Washington.—A brief visit to the capital of the country recently gave an opportunity of inspecting some of the botanical work in progress under the auspices of the government, a short account of which may interest others.

The casts of fruits, vegetables and fungi, naturally colored, with other material illustrative of the vegetable kingdom, first attract the attention of the visitor, as he passes through the museum on the second floor of the Agricultural Building on his way to the herbarium. Entering the herbarium one is pleasantly greeted by the head of the Botanical Division, Dr. Vasey. During his fifteen years of service the botanical work of the department has expanded and developed new features, giving rise to two lusty offshoots, the Forestry Division and the Section of Vegetable Pathology.

The large double room of the herbarium is lined with tall cases filled with the 200,000 sheets, or so, of mounted specimens, with tables and low cases in the center for bulky specimens. In this room also are the desks of the assistants. The division is fortunate in having recently secured the services of Mr. Crozier, of Michigan, who is now engaged in preparing a catalogue of the North American desiderata. This will be heartily appreciated by the botanists of the country, enabling them to contribute desirable material, as they have long expressed a willingness to do, when they should be informed of the needs of the herbarium.

On the next floor above are the rooms of the Forestry Division. The work here does not profess to be botanical, but as it deals with trees, many of the problems being treated biologically, and employs several eminent botanists in the field, the botanists of the country will naturally take an interest in the work and its results. Mr. Sudworth, of Michigan, has recently been appointed assistant.